

Claims

We Claim:

- 5 1. A semiconductor switching device comprising:
a body of semiconductor material including a first
major surface;
a first pair of current carrying electrodes formed
in the first major surface;
10 a second pair of current carrying electrodes formed
in the first major surface; and
a split control electrode structure including a
first control electrode formed on the body of
semiconductor material for controlling the first pair of
15 current carrying electrodes, and a second control
electrode formed on the body of semiconductor material
for controlling the second pair of current carrying
electrodes.
- 20 2. The device of claim 1 wherein the split control
electrode structure comprises a plurality of first
control electrodes and a plurality of second control
electrodes, wherein at least one second control electrode
is interdigitated between a pair of first control
25 electrodes.
3. The device of claim 1 wherein the split control
electrode structure comprises a plurality of first
control electrodes and a plurality of second control
30 electrodes, wherein more than one second control
electrode is interdigitated between a pair of first
control electrodes
4. The device of claim 1 wherein the split control
35 electrode structure comprises a plurality of first
control electrodes and a plurality of second control

electrodes, wherein at least one second control electrode is juxtaposed to at least one first control electrode.

5. The device of claim 1 wherein the first pair of
5 current carrying electrodes comprises a first source region and a first drain region, and wherein the second pair of current carrying electrodes comprises a second source region and a second drain region, and wherein the first and second source regions are coupled together with
10 a first electrode, and wherein the first and second drain regions are coupled together with second electrode.

6. The device of claim 1 further comprising a current
limit device coupled to the first and second control
15 electrodes.

7. The device of claim 1 further comprising a
comparator device for turning on the second control
electrode.
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8. The device of claim 1 wherein the first pair of
current carrying electrodes comprise a first drain region
and a first source region, and wherein the second pair of
current carrying electrodes comprise a second drain
25 region and second source region.

9. The device of claim 8 wherein the first drain region
and the second drain region form a common region within
the body of semiconductor material.
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10. A hot swap protection device comprising:
a split gate switching device including a first
MOSFET device having a first gate electrode and a second
MOSFET device having a second gate electrode;

a current limit device coupled to the first gate electrode for controlling the first MOSFET device during a current limit mode of operation; and

5 a comparator device coupled to the first and second control electrodes for turning on the second MOSFET device during non-current limit mode of operation.

11. The device of claim 10 wherein the split gate switching comprises:

10 a plurality of first gate electrodes for controlling a plurality of first MOSFET devices; and

a plurality of second gate electrodes for controlling a plurality of second MOSFET devices, wherein at least one second gate electrode is interdigitated
15 between a pair of first gate electrodes.

12. The device of claim 10 further comprising a load device coupled to drain regions of the first and second MOSFET devices.

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13. The device of claim 12 wherein the load device comprises a DC/DC converter.

14. The device of claim 10 wherein the first and second
25 MOSFET devices are formed in one body of semiconductor material.

15. The device of claim 10 wherein the first and second MOSFET devices, the current limit device, and the
30 comparator device are formed on one body of semiconductor material.

16. The device of claim 10 wherein the first MOSFET device forms an inrush current limit device.

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17. A method for forming semiconductor switching device comprising the steps:

providing a body of semiconductor material including a first major surface;

5 forming a first pair of current carrying electrodes in the first major surface;

forming a second pair of current carrying electrodes in the first major surface; and

forming a split control electrode structure
10 including a first control electrode on the body of semiconductor material for controlling the first pair of current carrying electrodes, and a second control electrode on the body of semiconductor material for controlling the second pair of current carrying
15 electrodes.

18. The method of claim 17 wherein the step of forming the split control electrode structure includes forming a plurality of first control electrodes and a plurality of
20 second control electrodes, wherein at least one second control electrode is interdigitated between a pair of first control electrodes.

19. The device of claim 17 wherein the step of forming
25 the split control electrode structure includes forming a plurality of first control electrodes and a plurality of second control electrodes, wherein more than one second control electrode is interdigitated between a pair of first control electrodes.

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20. The device of claim 17 wherein the step of forming the first pair of current carrying electrodes comprises forming a first drain region and a first source region, and wherein the step of forming the second pair of
35 current carrying electrodes comprises forming a second drain region and second source region.